

Costco Garage

HP Job # 64568

Submittal package for 230700 HVAC Insulation

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April 6, 2020

PCI Job # 20-01816

Holaday-Parks
4600 S 134th PI
Tukwila, WA 98168

Attention: Angela Eaton
Project: Costco Corporate HQ Parking Garage
Reference: Insulation Submittal - 220700 & 230700

Specification	Product
220700 2.2 A	Johns Manville Micro-Lok HP
220700 2.3 A	Johns Manville Zeston 2000 Series PVC
220700 2.3 B	RPR Products, Inc. - Insul-Mate Aluminum Jacketing
220700 2.3 B	RPR Products, Inc. - Insul-Mate Two Piece Elbow Covers
220700 2.3 B	RPR Products, Inc. - Insul-Mate Strapping and Seals
220700 2.4 C	Morgan Advanced Materials - FireMaster FastWrap XL
220700 2.5 A	Johns Manville Thermo-12 Gold
230700 2.2 A	Armacell - AP Armaflex Tube Insulation
230700 2.3 A	Johns Manville Zeston 2000 Series PVC
230700 2.5 A	Johns Manville Microlite XG

Attached are the manufacturer's submittal data. Please return a copy of the signed submittal.

Respectfully,

Grant Thomas
Project Engineer

WORLD-CLASS CONSTRUCTION®



220700 2.2 A

Johns Manville

DESCRIPTION

Micro-Lok *HP* Fiber Glass Pipe Insulation is a high-performance insulation made from rotary glass fibers bonded with a thermosetting resin and produced in 36" (0.92 m) lengths. Micro-Lok *HP* insulation is used to insulate standard iron pipe and copper tubing. The 3' (0.92 m) sections are available plain or with a factory-applied vapor-barrier jacket. The all-service (ASJ) vapor-retarder jacket includes a longitudinal, self-sealing closure lap. The jacket system is adhered to each fiber glass section using a specially formulated adhesive to ensure jacket securement.

The factory-installed tape system permits installation at ambient temperatures down to 20°F (-7°C) and will not soften or separate when exposed to high ambient temperatures and humidity.

USES

Micro-Lok *HP* fiber glass pipe insulation is suitable for installation over hot, cold, concealed and exposed piping systems with **operating temperatures up to 850°F (454°C)**. Weather-protective jacketing is required for outdoor applications. Pipes operating below ambient temperatures require all joints to be sealed with the factory-applied, self-seal lap and butt strips.

PHYSICAL PROPERTIES

Service Temp. Range (ASTM C411)	0°F to 850°F (-18°C to 454°C)
Moisture Sorption	<5% by weight
Alkalinity	<0.6% expressed as Na ₂ O
Corrosivity (ASTM C665)	Does not accelerate
Capillarity	Negligible (after 24 hours)
Shrinkage (ASTM C356)	None
Microbial Growth (ASTM C1338)	Does not promote microbial growth
Surface Burning Characteristics	Composite FHC 25/50 per ASTM E84, NFPA 255, CAN/ULC S102.2
Limited Combustibility	NFPA 90A and 90B
Jacketing	ASTM C1136 (Type I)
Water Vapor Permeance (ASTM E96 – Procedure A)	0.02 perms max.
Burst Strength (ASTM D774)	55 lbs/in ² (4.6 Kg/cm ²)
Tensile Strength (ASTM D828)	45 lbs./in. (7.9N/mm) width min. (MD) 30 lbs./in. (5.23N/mm) width min. (CD)

Operating Temperature Limits: 0°F to 850°F (-18°C to 454°C)

SPECIFICATION COMPLIANCE

- ASTM C547 Type I (Replaces HH-I-558B, Form D, Type III, Class 12, Class 13 up to 850°F (454°C))
- ASTM C585 – Dimension Standard
- ASTM C1136 (Jacketing) (Replaces HH-B-100B, Type I & II)
- MIL-I-22344D, MIL-PRF-22344E
- NRC 1.36, ASTM C795, MIL-I-24244C, MIL-DTL-24244D
- Coast Guard/IMO Approved 164.109/56/0 (plain, unjacketed only – excluding 7/8 x 1/2 [22 mm x 13 mm], 1/2 x 1/2 [13 mm x 13 mm])
- MEA compliant
- California Bureau of Home Furnishings and Thermal Insulation – Registry Number CA-T040 (CO)
- Firestop Assemblies: Meets requirement for jacketed fiber glass pipe insulation product density at or above 3.5 pcf.
- ASTM E84, CAN ULC S102.2 – 25/50 listed and labeled Intertek testing laboratories

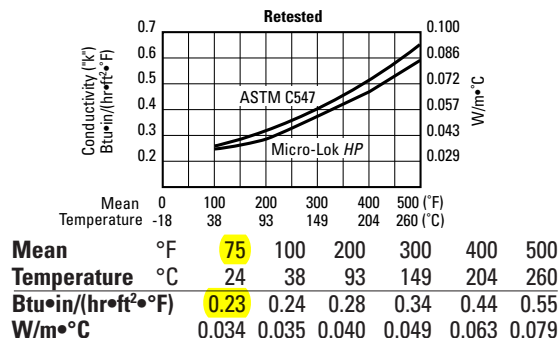
Mechanical Insulation

Micro-Lok® HP

High-Performance Fiber Glass Pipe Insulation



THERMAL CONDUCTIVITY ("K") *



* Apparent thermal conductivity values are determined by applying procedures dictated per ASTM C1045 on test data obtained using ASTM Test Method C335. All values are based on nominal manufacturing and testing parameters, are subject to normal variation, and are not guaranteed for specification purposes or otherwise.

GREEN BUILDING ATTRIBUTES

Manufacturing Location	Defiance, Ohio (43512)	
Recycled Content (glass only)	41%	
Recycled Content (total product)	33%	
Volatile Organic Compounds (ASTM D5116)	Total	0.15 g/l
(Analysis ASTM D6196 & ASTM D5197)		
Fiber Glass Pipe Insulation	Formaldehyde	0.009 ppm
	Aldehydes	0.009 ppm
Volatile Organic Compounds (Calculated)	Total	<49 g/l
Self-Sealing Lap & Butt Strips		

GREEN BUILDING CERTIFICATIONS

GREENGUARD®	Certified
GREENGUARD® GOLD	Certified
LEED® Credits	
LEED-NC	See JM.com/buildgreen JM LEED Credit Guide (HIG-1231)

GREENGUARD® Certified products have been screened for more than 10,000 volatile organic compounds (VOCs) and meet stringent standards for low chemical emissions based on established criteria from key public health agencies.



Micro-Lok® HP

High-Performance Fiber Glass Pipe Insulation

SIZE AVAILABILITY

Insulation Thickness		Iron Pipe Size Range		Copper Tubing Size Range	
in.	mm	in.	mm	in.	mm
½	13	½–6	13–152	⅝–4⅞ [§]	16–105
1	25	½–24	13–610	⅝–6⅞	16–156
1½	38	½–24	13–610	⅝–6⅞	16–156
2	51	½–24	13–610	1⅞–6⅞	29–156
2½	64	1–24	25–610	1⅞–6⅞	35–156
3	76	1–24	25–610	1⅞–6⅞	35–156
3½	89	1½–24*	38–610	—	—
4	102	3–24**	76–610	—	—
4½	114	3–24†	76–610	—	—
5	127	3–20††	76–508	—	—

Notes:

*2½" and 23" IPS not available in this insulation thickness.

**22" and 23" IPS not available in this insulation thickness.

†21", 22" and 23" IPS not available in this insulation thickness.

††19" IPS not available in this insulation thickness.

§3⅝" CTS not available in this insulation thickness.

QUALIFICATIONS FOR USE

A sufficient thickness of insulation must be used to keep the maximum surface temperature of Micro-Lok HP insulation below 150°F (66°C). In addition, at operating temperatures above 500°F (260°C), Micro-Lok HP pipe insulation must be applied in a thickness ranging from 2" (51 mm) minimum to 6" (152 mm) maximum.

During initial heat-up to operating temperatures above 350°F (177°C), an acrid odor and some smoke may be given off as the organic binders used in the fiber glass pipe insulation begin to decompose. When this occurs, caution should be exercised to ventilate the area well. This loss of binder does not directly affect the thermal performance of the pipe insulation, but the compressive strength and resiliency of the product are reduced. For applications with excessive physical abuse or vibration at high temperatures, consult your local Insulation Systems Market Development Manager for alternate material recommendations.

CHILLED WATER SYSTEMS

For chilled water systems, see Chilled Water InsulSpec™ – 3-Part Specification, MECH-239.

APPLICATION RECOMMENDATIONS*

MICRO-LOK HP PIPE INSULATION AND BUTT STRIPS

1. Do not apply Micro-Lok HP insulation if air temperature is below 20°F (-7°C) or above 130°F (54°C) due to the effect of temperature on tape performance. We recommend stapling when application falls outside this temperature range.

When stapling, we recommend mastic be applied over staples to prevent moisture penetration.

2. If stored below 20°F (-7°C) or above 130°F (54°C), insulation cartons should stand within the recommended temperature range for 24 hours prior to application.

3. Once release paper is removed, both adhesive and lap must be kept free of dirt and water, and the lap sealed immediately.

4. When adhered, the lap and butt strips must be pressurized by rubbing firmly with a plastic squeegee or the back of a knife blade to ensure positive closure.

*For complete application recommendations and installation instructions, see MECH-238 and MECH-239 InsulSpec Specifications.

North American Sales Offices, Insulation Systems



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Fax: (303) 978-4661

Technical specifications as shown in this literature are intended to be used as general guidelines only. Please refer to the Safety Data Sheet and product label prior to using this product. The physical and chemical properties of thermal insulation listed herein represent typical, average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Any references to numerical flame spread or smoke developed ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions. Check with the Regional Sales Office nearest you for current information. All Johns Manville products are sold subject to Johns Manville's Limited Warranty and Limitation of Remedy. For a copy of the Johns Manville Limited Warranty and Limitation of Remedy or for information on other Johns Manville thermal insulation and systems, visit the Johns Manville website or call (800)654-3103.

220700 2.3 A

230700 2.3 A



Mechanical Insulations

Zeston 2000® Series White PVC Insulated Fitting Covers and Jacketing

Features

- Protect insulated or bare pipes
- Meets most requirements for federal, state and local fire-safety codes
- Accepted for commercial, institutional, industrial and residential projects in all parts of the US
- System is uncomplicated and easy to install
- UV-resistant for outdoor applications
- Long-lasting protection and an attractive finished appearance
- Available with Hi-Lo Temp fiber glass inserts

Applications

- Commercial, institutional and industrial applications

Construction

- Covering and jacketing manufactured from high-impact, gloss white, UV-resistant polyvinyl chloride jacketing

Application Recommendations

- Wrap the Hi-Lo Temp fiber glass insert completely around the pipe fitting without overly compressing it or leaving any voids
- Ensure that the insulation insert covers all exposed surfaces
- Install the Zeston PVC fitting cover over the pipe fitting and fiber glass insert by securing the throat of the Zeston PVC insert using either serrated tacks, Perma-Weld adhesive or Zeston Z-Tape
- If applied in an outdoor setting or exposed to the sun, precautions should be taken to account for expansion joints



**ZESTON 2000 SERIES WHITE PVC
INSULATED FITTING COVERS AND JACKETING**

QUALIFICATIONS FOR USE

Hot Systems

- Use proper insulation thickness to ensure PVC covers are kept below 150°F (66°C)
- PVC covers should be kept away from contact with and/or exposure to sources of direct or radiated heat
- For fittings where operating temperatures exceed 250°F (121°C) or where pipe insulation thickness is greater than 1½" (38mm), two or more layers of Hi-Lo Temp insulation inserts are required beneath the fitting cover (refer to MECH-261 Zeston Hi-Lo Temp Inserts)

Cold Systems

- An approved vapor-barrier compatible with PVC must be applied between pipe insulation and fitting cover and on fitting cover throat overlap seal. Please refer to Insulspec MECH-261 on jm.com
- For fittings where operating temperature is below 45°F (7°C) or where the pipe insulation thickness is greater than 1½" (38mm), two or more layers of Hi-Lo Temp insulation inserts are required beneath fitting cover (refer to MECH-261 Zeston Hi-Lo Temp Inserts)

Refrigerant Systems and Cold Systems In Severe Ambient Conditioning

- Mitered pipe insulation segments, fabricated or pre-molded insulation shapes may be used in lieu of Hi-Lo temp insulation inserts
- An intermediate vapor-barrier compatible with PVC is required to completely seal the insulation prior to installing the Zeston 2000 PVC fitting cover
- Care should be taken to ensure the vapor barrier mastic is applied between the pipe insulation and the fitting cover and on the fitting cover throat overlap seam

Totally Sealed Systems (USDA Approval)

- 20 or 30 mil (0.5 mm or 0.8mm) Zeston PVC jacketing should be applied to pipe insulation in conjunction with Zeston PVC fitting covers
- Circumferential and longitudinal jacket and fitting cover seams should be sealed with Zeston Perma-Weld solvent welding adhesive
- Circumferential seams should be a minimum of 1" (25mm) overlap and longitudinal seams should be 1½" - 2" (38mm to 51mm) overlap
- Upon completion, all seams should visually be checked for seal and, if necessary, touched up
- Slip joints are periodically required between fixed supports and on continuous long runs of straight piping.
- To implement a slip joint, increase the circumferential overlap to 8" to 10" (203 mm to 254 mm) and apply a flexible white caulking in the overlap area to maintain a sealed system
- Refer to Zeston installation instructions CI-35 at www.jm.com

PERFORMANCE SPECIFICATIONS

Electrical Conductance	Non-conductor
Elongation at Yield (MD), %	3.0
Flame Spread	25 or less (up to 30 mil [0.8mm])
Flexural Modulus, psi (kPa)	430,000 (2,964,750)
Flexural Strength, psi (kPa)	11,000 (75,850)
	10 mil (0.3 mm) 1.3
	15 mil (0.4 mm) 1.4
	20 mil (0.5 mm) 1.5
	30 mil (0.8 mm) 1.6
Gardner - SPI Impact, in.lb./mil by Ductile Failure	50 or less (up to 30 mil [0.8 mm])
Smoke Developed	1.48
Specific Gravity	1.48
Tensile Modulus, psi (kPa)	425,000 (2,930,270)
Tensile Strength at Yield, psi (kPa)	6,000 (41,370)

SPECIFICATION COMPLIANCE

ASTM	D257 (Electrical surface resistance)
	D638 (Tensile strength)
	D790 (Flexural Strength)
	D792 (Density & specific gravity)
	D1784 (Specification for rigid PVC)
	D3679 (Specification for rigid PVC)
	E84 (Surface burning characteristics)
	E136 25/50 non-combustibility (fiber glass inserts)
Agriculture Canada	Pass (Canada Department of Agriculture)
Canada	CGSB51-GP-53M
CAN/ULC	S102
L-P*: Composition	535E (Federal standard for PVC)
A, Type II, Grade GU	1035A (US Army standard PVC)
New York City MEA	#7-87 (Toxicity test)
USDA	US Department of Agriculture

COMPRESSED THERMAL CONDUCTIVITY ZESTON HI-LO TEMP INSULATION INSERTS

Mean Temperature		"K"	
°F	°C	BTU•in/(hr•ft²•°F)	W/M•°C
75	24	0.23	0.033
150	66	0.27	0.039
300	149	0.40	0.058

FOR ADDITIONAL INFORMATION CONSULT THE FULL PRODUCT MANUAL.

The physical and chemical properties of PRODUCT listed herein represent typical, average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as technical service and are subject to change without notice. Numerical flame spread and smoke developed ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions. Check with the Regional Sales Office nearest you to assure current information. All Johns Manville products are sold subject to Johns Manville's standard Terms and Conditions including Limited Warranty and Limitation of Remedy. For a copy of the Johns Manville standard Terms and Conditions, Limited warranty and Limitation of Remedy, and information on other Johns Manville thermal insulations and systems, call (800) 654-3103. Limited Warranty and Limitation of Remedy. For a copy of the Johns Manville standard Terms and Conditions, Limited Warranty and Limitation of Remedy, and information on other Johns Manville thermal insulations and systems, call (800) 654-3103.

INSUL-MATE™
Aluminum Jacketing

DESCRIPTION/SPECIFICATIONS

RPR Products Insul-Mate™ Aluminum Jacketing is manufactured from wrought aluminum alloy 3003 or 3105 meeting **ASTM standard B209** with an H-14 temper. The properties of these aluminum alloys provide the required strength to resist in-service abuse, but can be easily fabricated and installed. The attractive mill finish maintains its sharp appearance, a necessity for any insulation project. Aluminum's resistance to atmospheric corrosion makes its use ideal, even in marine, chemical, industrial environments, or in industries processing food or beverages. Aluminum has an excellent resistance to corrosion which reduces cost through long service, without maintenance or painting.

Standards:	ASTM B209
Thicknesses:	.016" (.4mm) , .020" (.5mm), .024" (.6mm), .032" (.8mm), .040" (1.0mm)
Widths:	36" (914mm) and 48" (1219mm), Other widths available upon request
Lengths:	50' (15meters), 100' (30meters), 200' (60meters), 300' (90 meters), Coils (specify lengths), Flat Sheets (cut to length), Cut & Rolled (to specific lengths)
Profiles:	See Industrial Jacketing Data Sheet



FINISHES

Smooth, stucco embossed, 3/16" corrugated* (TVR) and corrugated stucco embossed (TVR)*.

*Corrugated is supplied in thicknesses up to .032" (.8mm) in 36" & 48" wide, .032" in 36" wide only

*Corrugated is supplied in 100 LF after corrugating.

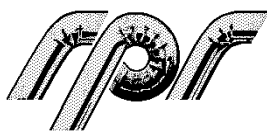
For added protection a moisture retarder can be applied to the inside of the metal. (See Moisture Data Sheet)

MOISTURE RETARDER

Insul-Mate™ Aluminum Jacketing products can be supplied with a 40# kraft (1 1/2 mil polyethylene) or a 3 mil polysurlyn moisture retarder which is heat and pressure bonded to the interior surface. A moisture retarder helps prevent galvanic corrosion caused by contact of dissimilar metals in the presence of moisture or chemical corrosion caused by installing sheets over damp insulation materials. (See Moisture Retarder Data Sheet)

RPR fabricates aluminum jacketing into precut – cut and rolled or flat cut pieces. Pieces are cut to accommodate various pipe and insulation sizes. They are produced to ASTM standards for industrial or commercial applications.





220700 2.3 B

DESCRIPTION

Insul-Mate aluminum elbow covers are formed from .024" thick, 1100 alloy, O-temper aluminum. The aluminum is coated with baked-on epoxy paint on the inside to resist electrolytic decomposition and an acrylic paint on the outside to resist oxidation. The elbow covers are manufactured to ASTM C-450 specifications and 90 degree and 45 degree insulated ells ranging from 1/2" to 12" nominal iron pipe size. Insul-Mate aluminum elbow covers are available in smooth and stucco embossed finish.

Insul-Mate stainless steel elbow covers are formed from .016" thick, T316 stainless steel. The elbows are manufactured to meet ASTM C-450 and fit 90 degree and 45 degree insulated ells from 1/2" to 6" nominal iron pipe size. Insul-Mate stainless steel elbow covers are available in smooth finish only.

90° Aluminum						
Iron Pipe Size	Insulation Thickness					
	1/2"	1"	1 1/2"	2"	2 1/2"	3"
1/2"	# 1	# 2	# 5	# 8	# 12	# 23
3/4"	# 1	# 2	# 5	# 8	# 12	# 23
1"		# 3	# 6	# 11	# 12	# 23
1 1/4"		# 3	# 9	# 11	# 18	# 23
1 1/2"		# 4	# 9	# 18	# 23	# 24
2"		# 7	# 10	# 18	# 20	# 24
2 1/2"		# 13	# 16	# 20	# 24	# 30
3"		# 14	# 19	# 22	# 24	# 30
3 1/2"		# 17	# 21	# 27	# 30	# 33
4"		# 17	# 21	# 27	# 30	# 33
4 1/2"		# 28	# 27	# 30	# 33	# 39
5"		# 28	# 29	# 36	# 38	# 39
6"		# 32	# 35	# 37	# 39	# 44
8"		# 41	# 42	# 43	# 47	# 49
10"		# 46	# 50	# 51	# 55	# 56
12"			# 55	# 56		

45° Aluminum					
Iron Pipe Size	Insulation Thickness				
	1"	1 1/2"	2"	2 1/2"	3"
1/2"	# 1	# 3	# 5		
3/4"	# 1	# 3	# 5		
1"	# 2	# 4	# 6	# 7	# 8
1 1/4"	# 2	# 5	# 6	# 7	# 8
1 1/2"	# 3	# 5	# 9	# 8	# 9
2"	# 4	# 6	# 7	# 8	# 9
2 1/2"	# 5	# 7	# 7	# 9	# 10
3"	# 6	# 7	# 8	# 9	# 10
3 1/2"	# 7	# 8	# 8	# 10	# 11
4"	# 7	# 8	# 9	# 10	# 11
4 1/2"	# 8	# 9	# 9	# 11	# 12
5"	# 8	# 9	# 10	# 11	# 12
6"	# 9	# 10	# 10	# 12	# 13
8"	# 11	# 12	# 11	# 14	# 15
10"	# 13	# 14	# 13		
12"	# 15		# 15		

90° Stainless Steel					
Iron Pipe Size	Insulation Thickness				
	1"	1 1/2"	2"	2 1/2"	3"
1/2"	# 2	# 5	# 8	# 12	# 23
3/4"	# 2	# 5	# 8	# 12	# 23
1"	# 3	# 6	# 11	# 12	# 23
1 1/4"	# 3	# 9	# 11	# 18	# 23
1 1/2"	# 4	# 9	# 18	# 23	# 24
2"	# 7	# 10	# 18	# 20	# 24
2 1/2"	# 13	# 16	# 20	# 24	# 30
3"	# 14	# 19	# 22	# 24	# 30
3 1/2"	# 17	# 21	# 27	# 30	# 33
4"	# 17	# 21	# 27	# 30	# 33
4 1/2"	# 28	# 27	# 30	# 33	
5"	# 28	# 29			
6"	# 32	# 35			
8"					
10"					
12"					


STAINLESS STEEL STRAPPING

Insul-Mate stainless steel strapping is manufactured from T-304, and T-316 alloys in the soft annealed temper (ASTM-240). It is available in **3/8"**, 1/2 " and 3/4 " widths x .015" and .020" thickness. The available ribbon-wound or oscillated coils are edge conditional for safety in handling.

ALUMINUM STRAPPING

Insul-Mate aluminum strapping is manufactured from 3105 aluminum alloy (ASTM B-209) in 3/8", 1/2 " and 3/4 " widths x .020" thickness. The available ribbon-wound or oscillated coils are edge conditioned for safety in handling.

MONEL STRAPPING

Insul-Mate monel strapping is manufactured from monel nickel-copper alloy 400, a tough high strength alloy with excellent resistance to many corrosive environments. It is available in 1/2 " and 3/4 " widths x .020" thickness. The available ribbon-wound or oscillated coils are edge conditioned for safety in handling.

PACKAGING

Aluminum	Stainless Steel	Monel
3/8" - 8 # ctn	3/8" - 22 # ctn	-
1/2" - 10 # ctn	1/2" - 28 # ctn	1/2" - 28 # ctn
3/4" - 15 # ctn	3/4" - 42 # ctn	3/4" - 42 # ctn

COLOR CODED STRAPPING

Insul-Mate color coded strapping, in both stainless steel and aluminum, is coated with a unique two-coat, baked-on paint system which offers superior resistance to fading, cracking and peeling. It is designed to be used as a line identifier indicating the absence of asbestos beneath the jacketing. The stamping of the words "No Asbestos" is available as an extra-cost item.

Product	Standard Color
Stainless Steel	Blue/Blue
Stainless Steel	Blue/Black
Stainless Steel	Marine Corps Green/ Marine Corps Green
Aluminum	Red/Blue

WING SEALS

RPR Products Insul-Mate wing seals are available in aluminum and stainless steel to match the strapping being used. Wing seals are precision fabricated for exact fit and easy application. Aluminum and stainless steel (T-304 and T-316) are available in **3/8"**, 1/2", and 3/4" widths.


SHEET METAL SCREWS

Stainless steel self tapping & self drilling screws are manufactured from 18-8 austenitic stainless steel. They are available in most popular sizes. Multi-TEKS and other specialty screws are available upon request.

Data sheet

FireMaster® FastWrap XL

220700 2.4 C

ENGLISH



Description

FireMaster® FastWrap XL - a flexible blanket composed of high temperature fibres classified for applications to 1200°C (2192°F) and fully encapsulated in a durable glass fibre reinforced aluminium foil facing for easy handling and installation.

The foil encapsulation of the blanket prevents water, moisture or grease ingress ensuring good integrity and avoiding promotion of mould growth.

The core fibres in FastWrap XL are manufactured using Morgan Thermal Ceramics patented Superwool® fibre which is an alkaline earth silicate wool with low biopersistence exonerated from carcinogenic classification under Nota Q of the European Union Directive 97/69/EC.

Features

- Thin and lightweight
- Contours easily to complex duct designs
- Fully foil encapsulated for fast and clean installation
- Contains 1200°C (2192°F) rated fibre
- Good sound absorption
- A1 Reaction to Fire Classification in accordance with EN 13501-1

Applications

- Fire Protection of ventilation ducting for up to 2 hours in accordance with ISO 6944, BS 476 part 24 and EN 1366-1 standards.

Please refer to our Ductwork Fire Protection Design and Installation Manual FM 5.0 for more details.



FIREMASTER®

Data sheet

FireMaster® FastWrap XL

Physical characteristics

Product	Thickness mm	Roll size		Roll / Carton	Weight / Carton kg
		Length mm	Width mm		
FastWrap XL 96kg/m ³	38	4800	610	1	12.6
	38	4800	1220	1	25.1
	38	7620	610	1	19.6
	38	7620	1220	1	39.2

FastWrap XL is also available in a special variant of 25mm x 80 kg/m³ for low temperature smoke duct fire protection applications. Please contact your local office for details.

Storage

FireMaster® FastWrap XL should be stored in a dry warehouse environment on pallets. Pallets should not be stacked.

Contact

Europe:

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Whilst the values and application information in this datasheet are typical, they are given for guidance only. The values and the information given are subject to normal manufacturing variation and may be subject to change without notice. Morgan Advanced Materials – Thermal Ceramics makes no guarantees and gives no warranties about the suitability of a product and you should seek advice to confirm the product's suitability for use with Morgan Advanced Materials - Thermal Ceramics.

SUPERWOOL® is a patented technology for high temperature insulation wools which have been developed to have a low bio persistence (information upon request). **SUPERWOOL®** products may be covered by one or more of the following patents, or their foreign equivalents:

SUPERWOOL® PLUS and **SUPERWOOL® HT** products are covered by patent numbers: US5714421 and US7470641, US7651965, US7875566, EP1544177 and EP1725503 respectively.


A list of foreign patent numbers is available upon request to Morgan Advanced Materials plc.

Morgan Advanced Materials plc Registered in England & Wales at Quadrant, 55-57 High Street, Windsor, Berkshire SL4 1LP UK Company No. 286773

PRODUCT DATA SHEET

220700 2.5 A


Thermo-12® Gold

Thermo-12 Gold is a preformed, high-temperature, abuse-resistant pipe and block insulation with exceptional structural strength, composed of hydrous calcium silicate for use on systems operating up to 1200°F(650°C). It is inorganic, non-combustible, Asbestos Free and meets or exceeds the physical and thermal property requirements of ASTM C533, Type 1. Integral to Thermo-12 Gold is,  a distinctive formula and process that inhibits corrosion to outside surfaces of pipe and equipment.

THE ADVANTAGES

- Excellent resistance to damage enhancing the life of the system.
- Inhibits corrosion on carbon steel and stainless steel piping and equipment.
- Consistent thermal performance to 1200°F(650°C).
- Non-Combustible Insulation.
- Structural strength protects against damage to lagging.
- Asbestos, Mercury and Lead Free.
- No organic binders; No loss of insulation integrity due to binder burn out.
- Large selection of sizes and forms.

APPLICATIONS

Thermo-12 Gold is the product of choice for high-temperature pipe and equipment due to its high strength and durability, low thermal conductivity and corrosion inhibiting performance. Thermo-12 Gold is especially recommended for use in the petrochemical, power generation and process industries where piping and equipment **operating up to 1200°F (650°C)**. The  corrosion inhibiting properties are not diminished by temperature cycling so the corrosion protection will continue for the life of the product. Thermo-12 Gold will not burn and may be used as a component in fire protection systems in the some applications. Please visit our website at www.jm.com/industrial for specific application information.

FIRE SAFETY

Surface Burning Characteristics. When tested in accordance with ASTM E84, NFPA 255, and UL 723, Thermo-12 Gold has flame spread/smoke developed ratings of 0/0.

Non-Combustible. When tested in accordance with ASTM E136 as defined by NFPA 255 and NFPA 101.

ADDITIONAL INFORMATION AND SDS

Please visit our website at www.jm.com/industrial

**CUSTOMER SERVICE, TECHNICAL & GENERAL
INFORMATION (800) 866-3234**

IND-300 12-16 (Replaces IND-300 01-16)



AVAILABLE FORMS AND SIZES

Pipe Sizes		Thermo-12 Gold
in.	mm	
½-24	15-600	Pipe Insulation
20-37	500-925	Quad Segments
38-52	950-1300	Hex Pipe Covering (Ruston Plant Only)
30 min	750 min	3-V Scored Block Width - 12" (305 mm) Length - 36" (914 mm)
Flat Surfaces		Flat Block Width - 6" and 12" (152 mm and 305 mm) Length - 36" (914 mm)

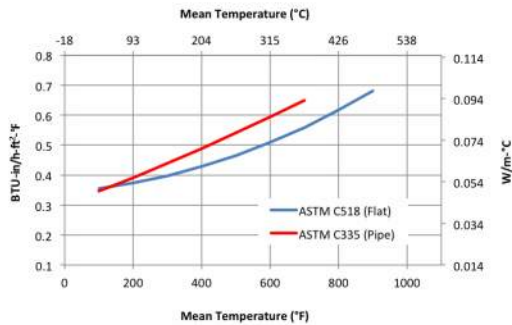
Thermo-12 Gold pipe insulation is 36" (914 mm) in length, and is available in thicknesses from 1" to 6" (25 mm to 150 mm) in ½" (15 mm) increments. Thick wall material is furnished in double layers.

Thermo-12 Gold flat block insulation is 12" (305 mm) wide and 36" (914 mm) in length, and is available in thicknesses from 1" to 4" (25 mm to 100 mm) in ½" (15 mm) increments. Non-standard widths of 18" and 24" (457 mm and 610 mm) are available on a made-to-order basis. Inquire for price and availability.

3-V SCORED BLOCK APPLICATION GUIDE

Minimum Diameter			
Insulation Thickness		Triple Scored	
in.	mm	in.	mm
1½	38	30	762
2	51	40	1016
2½	64	50	1270
3	76	60	1524
3½	89	70	1778
4	102	80	2032

THERMAL CONDUCTIVITY



	Mean Temperature	°F	100	200	300	400	500	600	700
			38	93	149	204	260	316	371
ASTM C335 (Pipe)	Btu • in/(hr • ft² • °F)		.344	.389	.437	.486	.538	.591	.647
	W/m • °C		.050	.056	.063	.070	.078	.085	.093
ASTM C518 (Flat)	Btu • in/(hr • ft² • °F)		.355	.373	.397	.428	.465	.509	.559
	W/m • °C		.051	.054	.057	.062	.067	.073	.081

* Thermo-12 Gold Insulation is tested in accordance with ASTM C518 and ASTM C335.

PRODUCT CERTIFICATION

When ordering material to comply with any government specification or any other listed specification, a statement of that fact must appear on the purchase order. Government regulations and other listed specifications require specific lot testing, and prohibit the certification of compliance after shipment has been made. There may be additional charges associated with specification compliance testing. Please refer to IND-CSP-3 for Certification Procedures and Charges. Call customer service for more information.

ISO 9000 CERTIFICATION

Thermo-12 Gold is manufactured and tested in our own facilities under implemented Quality Management Systems which are certified to be in accordance with stringent ISO 9000 series quality standards. This certification, along with regular independent third-party auditing for compliance, is your assurance that this product delivers consistent high quality.

SPECIFICATION COMPLIANCE

ASTM C165 Compressive Strength	>100psi(690kPa) 5% compression
ASTM C203 Flexural Strength	>50psi(450kPa)
ASTM C302 Density (Dry) Average	>14pcf(230kg/m³)
ASTM C356 Linear Shrinkage	<2.0% after 24hr Soaking period at 1200°F(650°C)
ASTM C421 Abrasion Resistance Weight Loss by Tumbling	After the first 10min <20% After the second 10min<40%
ASTM C447 Maximum Service Temperature	1200°F(650°C)
ASTM C533, Type I Material Specification	Passes
ASTM C665 Corrosivity to Steel	Passes
ASTM C795/C871/C692 Corrosion: Austenitic Stainless Steel	Passes
ASTM C1338 Fungi Resistant	Passes
ASTM C1617 Corrosion	Passes-
ASTM E84 Surface Burning Characteristics	Flame Spread -0 Smoke Developed -0
ASTM E119 Building Fire Test	Passes
ASTM E136 Non-Combustible	Passes
BS 476 PART II	Passes
Can/ULC S-102 Surface Burning Characteristics	Flame Spread -0 Smoke Developed -0
NFPA 255 Surface Burning Characteristics	Flame Spread -0 Smoke Developed -0
ISO 8143 Material Specification	Passes
NRC Reg. Guide 1.36	Passes
MIL-I-24244 Military Specification	Passes
MIL-I-2781F to 1200°F(650°C) [Pipe] Military Specification	Passes
MIL-I-2819F Class 2 to 1200°F(650°C) [Block] Military Specification	Passes

Industrial Insulation Group, LLC manufactures MinWool-1200® mineral fiber pipe, block and a variety of other insulations; Thermo-12® Gold Calcium Silicate pipe and block insulation; Microporous Blanket Insulation; Super Firetemp® fireproofing board; SprouleWR-1200® Perlite pipe and block insulation; high-temperature adhesives, and insulating finishing cement. The physical and chemical properties presented herein represent typical, average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Numerical flame spread and smoke developed ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions. Check with the Customer Service Office to assure current information. All Industrial Insulation Group products are sold subject to the Johns Manville Limited Warranty and Limitation of Remedy. For a copy of the Johns Manville Limited Warranty and Limitation of Remedy, email info.industrial@jm.com.

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SOLUTIONS FOR ENERGY SAVINGS

AP ArmaFlex®

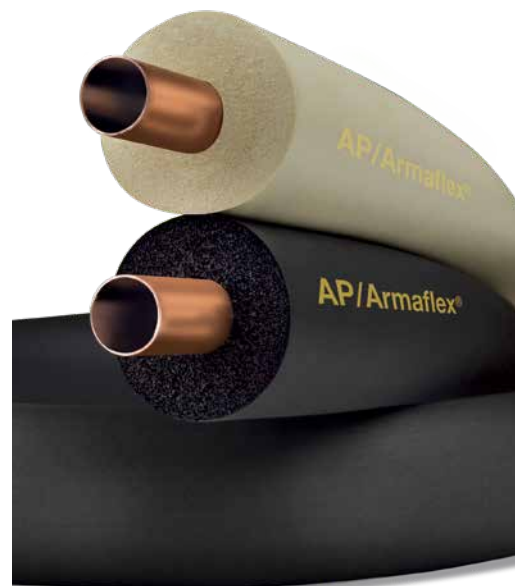
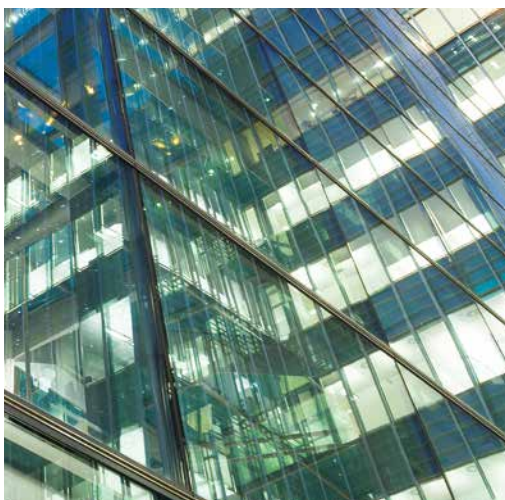
Black and White Tube Insulation

The original, fiber-free, flexible elastomeric pipe insulation for reliable protection against condensation and energy loss.

- // Fiber-free, formaldehyde-free, low VOC and non-particulating formulation protects indoor air quality
- // Closed-cell structure provides excellent condensation control
- // Built-in vapor barrier eliminates need for additional vapor retarder

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 **armacell®**
AP ArmaFlex®

TECHNICAL DATA – AP ArmaFlex® BLACK AND WHITE TUBE INSULATION

Description

Black or off-white flexible closed-cell elastomeric thermal insulation in a tubular form

Applications

Insulation for piping associated with HVAC, VRF and VRF systems, chillers, hot and cold water, refrigeration

Specification Compliance

ASTM C 534, Type I – Grade 1	ASTM G21/C1338	MEA 107-89M	UL 181
ASTM D 1056, 2C1	ASTM G22	MIL-P-15280J, FORM T ②	UL 94 5V-A, V-0, File E55798
ASTM E 84, NFPA 255, UL723	CAN/ULC S102 ①	NFPA 90A, 90B	City of LA – RR 7642

Approvals, Certifications, Compliances

- 3rd party certified by FM Approvals through 1-1/2" wall thickness
- GREENGUARD® Children & Schools Indoor Air Quality certified.
- Manufactured without CFCs, HFCs, HCFCs, PBDEs, or Formaldehyde.
- Made with EPA registered Microban® antimicrobial product protection.
- All Armacell facilities in North America are ISO 9001:2008 certified.
- Plenum Rated

Typical Properties

Specifications	Values		Test Method
	3/8" through 1" Walls	1-1/2" and 2" Walls	
Thermal Conductivity: Btu • in/h • ft ² • °F (W/mK)			
75°F Mean Temperature [24°C]	0.245 [0.0353]	0.28 [0.040]	ASTM C 177 or C 518
90°F Mean Temperature [32°C]	0.254 [0.0366]	0.286 [0.041]	
Water Vapor Permeability: Perm-in. [Kg/(s • m • Pa)]	0.05 [0.725 x 10 ⁻¹³]	0.08 [1.16 x 10 ⁻¹³]	ASTM E 96, Procedure A
Flame Spread and Smoke Developed Index:	25/50 rated	25/50 rated	ASTM E 84 CAN/ULC S102 ①
Water Absorption, % by Volume:	0.2 %	0.2 %	ASTM C 209 or ASTM C1763
Mold Growth:	Passed	Passed	UL181
Fungi Resistance:			ASTM G21/C1338
Bacterial Resistance:			ASTM G22
Upper Use Limit:	220°F [105°C] ③	300°F [149°C] ④	ASTM C534
Lower Use Limit: ⑤	-297°F [-183°C] ⑥	-297°F [-183°C] ⑥	ASTM C534

Sizes

Wall Thickness [nominal]	3/8", 1/2", 3/4", 1", 1-1/2", 2" [10, 13, 19, 25, 38, 50 mm]
Inside Diameter, Tubular	3/8" ID to 10" ID [10 mm ID to 250 mm ID]
Length of Sections, Feet, Tubular	6' [1.8 m] [Some larger sizes may be shipped in two 3' sections]

Outdoor Use

Painting with WB Finish or other protective jacketing is required to prevent damage to the insulation in exterior applications and to comply with the insulation protection sections of the International Energy Conservation Code (IECC) and ASHRAE 90.1.

① AP ArmaFlex meets CAN/ULC S102 through 1" wall. AP ArmaFlex Black tested. AP ArmaFlex White determined to be comparable through 1" wall.

② AP ArmaFlex meets MIL-P-15280J through 1" wall.

③ AP ArmaFlex Pipe Insulation can withstand temperatures as high as 250°F for 96 hour time periods when tested according to ASTM C411 - Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.

④ 1-1/2" and 2" AP ArmaFlex tubes are formulated with EPDM rubber giving them a higher upper use temperature than AP ArmaFlex tubes less than 1-1/2" wall thickness.

⑤ At temperatures below -20°F [-29°C], elastomeric insulation starts to become less flexible. However, this characteristic does not affect thermal efficiency and resistance to water vapor permeability of ArmaFlex insulation.

⑥ For applications of -40°F to -297°F [-40°C to -183°C], contact Armacell.



GREENGUARD Certified products are certified to GREENGUARD standards for low chemical emissions into indoor air during product usage. For more information, visit ul.com/gg.

Microban antimicrobial product protection is limited to the product itself and is not designed to protect the users of these products from disease causing microorganisms, or as a substitute for normal cleaning and hygiene practices. Microban International, Ltd. makes neither direct nor implied health claims for the products containing Microban® antimicrobial product protection. Data, photomicrographs and information presented are based on standard laboratory tests and are provided for comparative purposes to substantiate antimicrobial activity for non-public health uses. Microban is a registered trademark of Microban International, Ltd.

AP ArmaFlex BLACK TUBES - R VALUES

3/8" WALLS

IPAPT01438	3/16" Copper	2.8
IPAPT03838	1/4" Copper	2.8
IPPT01238	3/8" Copper	2.6
IPAPT05838	1/2" Copper	2.6
IPAPT03438	5/8" Copper	2.4
IPAPT07838	3/4" Copper	2.4
IPAPT11838	1" Copper	2.3
IPAPT13838	1-1/4" Copper	2.2
IPAPT15838	1-1/2" Copper	2.5
IPAPT11038	1-1/2" IPS	2.4
IPAPT21838	2" Copper	2.4
IPAPT20038	2" IPS	2.4
IPAPT25838	2-1/2" Copper	2.4
IPAPT21038	2-1/2" IPS	2.4
IPAPT31838	3" Copper	2.4
IPAPT30038	3" IPS	2.3

1/2" Walls

IPAPT01412	3/16" Copper	3.8
IPAPT03812	1/4" Copper	3.3
IPAPT01212	3/8" Copper	3.3
IPAPT05812	1/2" Copper	3.4
IPAPT03412	5/8" Copper	3.3
IPAPT07812	3/4" Copper	3.3
IPAPT11812	1" Copper	3.3
IPAPT13812	1-1/4" Copper	3.2
IPAPT15812	1-1/2" Copper	3.2
IPAPT11012	1-1/2" IPS	3.1
IPAPT21812	2" Copper	3.2
IPAPT20012	2" IPS	3.2
IPAPT25812	2-1/2" Copper	3.2
IPAPT21012	2-1/2" IPS	3.2
IPAPT31812	3" Copper	3.2
IPAPT30012	3" IPS	3.1
IPAPT35812	3-1/2" Copper	3.1
IPAPT41812R	4" Copper	3.1
IPAPT40012R	4" IPS	3.0
IPAPT50012R	5" IPS	3.0
IPAPT60012R	6" IPS	3.0
IPAPT80012R	8" IPS	2.9

3/4" WALLS

IPAPT01434	3/16" Copper	6.4
IPAPT03834	1/4" Copper	5.9
IPAPT01234	3/8" Copper	5.5
IPAPT05834	1/2" Copper	5.6
IPAPT03434	5/8" Copper	5.5
IPAPT07834	3/4" Copper	5.4
IPAPT11834	1" Copper	5.4
IPAPT13834	1-1/4" Copper	5.3
IPAPT15834	1-1/2" Copper	5.1
IPAPT11034	1-1/2" IPS	4.9
IPAPT21834	2" Copper	4.8
IPAPT20034	2" IPS	5.2
IPAPT25834	2-1/2" Copper	4.7
IPAPT21034	2-1/2" IPS	5.0
IPAPT31834	3" Copper	4.6
IPAPT30034	3" IPS	4.9

3/4" WALLS (continued)

IPAPT35834	3-1/2" Copper	4.5
IPAPT41834R	4" Copper	4.5
IPAPT40034R	4" IPS	4.8
IPAPT50034R	5" IPS	4.7
IPAPT60034R	6" IPS	4.6
IPAPT80034R	8" IPS	4.5

1" WALLS

IPAPT01410	3/16" Copper	2.8
IPAPT03810	1/4" Copper	7.3
IPAPT01210	3/8" Copper	7.2
IPAPT05810	1/2" Copper	7.2
IPAPT03410	5/8" Copper	7.0
IPAPT07810	3/4" Copper	7.0
IPAPT11810	1" Copper	7.2
IPAPT13810	1-1/4" Copper	7.2
IPAPT15810	1-1/2" Copper	7.2
IPAPT11010	1-1/2" IPS	6.9
IPAPT21810	2" Copper	6.8
IPAPT20010	2" IPS	7.1
IPAPT25810	2-1/2" Copper	6.5
IPAPT21010	2-1/2" IPS	6.8
IPAPT31810	3" Copper	6.3
IPAPT30010	3" IPS	6.6
IPAPT35810	3-1/2" Copper	6.2
IPAPT41810R	4" Copper	6.1
IPAPT40010R	4" IPS	6.4
IPAPT50010R	5" IPS	6.2
IPAPT60010R	6" IPS	6.1
IPAPT80010R	8" IPS	5.9
IPAPT10010R	10" IPS	5.8

1-1/2" WALLS

IPAPT03815	1/4" Copper	13.7
IPAPT01215	3/8" Copper	12.7
IPAPT05815	1/2" Copper	12.0
IPAPT03415	5/8" Copper	11.3
IPAPT07815	3/4" Copper	10.8
IPAPT11815	1" Copper	10.1
IPAPT13815	1-1/4" Copper	9.6
IPAPT15815	1-1/2" Copper	9.2
IPAPT11015	1-1/2" IPS	8.7
IPAPT21815	2" Copper	8.6
IPAPT20015	2" IPS	8.8
IPAPT25815	2-1/2" Copper	8.2
IPAPT21015	2-1/2" IPS	8.4
IPAPT31815	3" Copper	7.9
IPAPT30015	3" IPS	8.1
IPAPT35815	3-1/2" Copper	7.7
IPAPT41815R	4" Copper	7.5
IPAPT40015R	4" IPS	7.8
IPAPT50015R	5" IPS	7.5
IPAPT61815R	6" Copper	7.4
IPAPT60015R	6" IPS	7.3
IPAPT80015R	8" IPS	7.0
IPAPT10015R	10" IPS	6.8

2" WALLS

IPAPT03820	1/4" Copper	19.7
IPAPT01220	3/8" Copper	18.2
IPAPT05820	1/2" Copper	17.2
IPAPT03420	5/8" Copper	16.2
IPAPT07820	3/4" Copper	15.5
IPAPT11820	1" Copper	14.5
IPAPT13820	1-1/4" Copper	13.7
IPAPT15820	1-1/2" Copper	13.1
IPAPT11020	1-1/2" IPS	12.4
IPAPT21820	2" Copper	12.2
IPAPT20020	2" IPS	12.3
IPAPT25820	2-1/2" Copper	11.6
IPAPT21020	2-1/2" IPS	11.7
IPAPT31820	3" Copper	11.1
IPAPT30020	3" IPS	11.2
IPAPT35820	3-1/2" Copper	10.7
IPAPT41820R	4" Copper	10.5
IPAPT40020R	4" IPS	10.7
IPAPT50020R	5" IPS	10.2
IPAPT60020R	6" IPS	9.9
IPAPT80020R	8" IPS	9.5
IPAPT10020R	10" IPS	9.2

*These specifications are based on the measurement methods employed by Armacell. Other methods may not result in the same values and cannot be used to determine if the product is within the given tolerance.

AP ArmaFlex WHITE TUBES - R VALUES

1/2" Walls

IPWTT03812	1/4" Copper	3.3
IPWTT01212	3/8" Copper	3.3
IPWTT05812	1/2" Copper	3.4
IPWTT03412	5/8" Copper	3.3
IPWTT07812	3/4" Copper	3.3
IPWTT11812	1" Copper	3.3
IPWTT13812	1-1/4" Copper	3.2
IPWTT15812	1-1/2" Copper	3.2
IPWTT11012	1-1/2" IPS	3.1
IPWTT21812	2" Copper	3.2
IPWTT20012	2" IPS	3.5
IPWTT25812	2-1/2" Copper	3.4
IPWTT21012	2-1/2" IPS	3.4
IPWTT31812	3" Copper	3.3

3/4" WALLS

IPWTT03834	1/4" Copper	5.9
IPWTT01234	3/8" Copper	5.5
IPWTT05834	1/2" Copper	5.7
IPWTT03434	5/8" Copper	5.5
IPWTT07834	3/4" Copper	5.5
IPWTT11834	1" Copper	5.5
IPWTT13834	1-1/4" Copper	5.4
IPWTT15834	1-1/2" Copper	5.2
IPWTT11034	1-1/2" IPS	5.0
IPWTT21834	2" Copper	4.9
IPWTT20034	2" IPS	4.9
IPWTT25834	2-1/2" Copper	4.8
IPWTT21034	2-1/2" IPS	4.8
IPWTT31834	3" Copper	4.7
IPWTT30034	3" IPS	4.6
IPWTT35834	3-1/2" Copper	4.6
IPWTT41834R	4" Copper	4.5

1" WALLS

IPWTT03810	1/4" Copper	10.2
IPWTT01210	3/8" Copper	9.5
IPWTT05810	1/2" Copper	9.1
IPWTT03410	5/8" Copper	8.6
IPWTT07810	3/4" Copper	8.3
IPWTT11810	1" Copper	7.7
IPWTT13810	1-1/4" Copper	7.4
IPWTT15810	1-1/2" Copper	7.3
IPWTT11010	1-1/2" IPS	7.0
IPWTT21810	2" Copper	6.9
IPWTT25810	2-1/2" Copper	6.6
IPWTT31810	3" Copper	6.4
IPWTT35810	3-1/2" Copper	6.3

1-1/2" WALLS

IPWTT03815	1/4" Copper	13.7
IPWTT01215	3/8" Copper	12.7
IPWTT05815	1/2" Copper	12.0
IPWTT03415	5/8" Copper	11.4
IPWTT07815	3/4" Copper	10.9
IPWTT11815	1" Copper	10.2
IPWTT13815	1-1/4" Copper	9.7
IPWTT15815	1-1/2" Copper	9.3
IPWTT11015	1-1/2" IPS	8.9
IPWTT21815	2" Copper	8.7
IPWTT20015	2" IPS	8.5
IPWTT25815	2-1/2" Copper	8.3
IPWTT21015	2-1/2" IPS	8.1
IPWTT31815	3" Copper	8.0
IPWTT30015	3" IPS	7.8
IPWTT35815	3-1/2" Copper	7.8
IPWTT41815R	4" Copper	7.6
IPWTT40015R	4" IPS	7.4
IPWTT50015R	5" IPS	7.2
IPWTT60015R	6" IPS	7.0

2" WALLS

IPWTT03820	1/4" Copper	19.7
IPWTT01220	3/8" Copper	18.2
IPWTT05820	1/2" Copper	17.3
IPWTT03420	5/8" Copper	16.3
IPWTT07820	3/4" Copper	15.7
IPWTT11820	1" Copper	14.6
IPWTT13820	1-1/4" Copper	13.8
IPWTT15820	1-1/2" Copper	13.2
IPWTT21820	2" Copper	12.3
IPWTT20020	2" IPS	12.0
IPWTT25820	2-1/2" Copper	11.7
IPWTT31820	3" Copper	11.2
IPWTT30020	3" IPS	10.9
IPWTT35820	3-1/2" Copper	10.8
IPWTT41820R	4" Copper	10.5
IPWTT40020R	4" IPS	10.3
IPWTT50020R	5" IPS	9.9
IPWTT60020R	6" IPS	9.6

*These specifications are based on the measurement methods employed by Armacell. Other methods may not result in the same values and cannot be used to determine if the product is within the given tolerance.

All data and technical information are based on results achieved under typical application conditions. It is the customer's responsibility to verify if the product is suitable for the intended application. The responsibility for professional and correct installation and compliance with relevant building regulations lies with the customer. By ordering/receiving product you accept the **Armacell General Terms and Conditions of Sale** applicable in the region. Please request a copy if you have not received these.

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AP ArmaFlex | Tube TDS | 112018 | NAI EN-A | 017

ABOUT ARMACELL

As the inventors of flexible foam for equipment insulation and a leading provider of engineered foams, Armacell develops innovative and safe thermal, acoustic and mechanical solutions that create sustainable value for its customers. Armacell's products significantly contribute to global energy efficiency making a difference around the world every day. With 3,000 employees and 26 production plants in 17 countries, the company operates two main businesses, Advanced Insulation and Engineered Foams. Armacell focuses on insulation materials for technical equipment, high-performance foams for high-tech and lightweight applications and next generation aerogel blanket technology.

For more information, please visit:
www.armacell.us
 800-866-5638

 **armacell**
 AP ArmaFlex®



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Johns Manville

Air Handling Systems

Microlite® XG™

Formaldehyde-free™ Fiber Glass Duct Wrap Insulation

Description

Microlite XG Formaldehyde-free™ duct wrap insulation is a white, light-weight, highly resilient, blanket-type thermal insulation. The insulation blanket is manufactured from rotary-process fiber glass bonded with a special thermosetting acrylic resin.

Available Forms

Microlite XG Formaldehyde-free™ insulation is available in a variety of densities, thicknesses and roll lengths. It is supplied with an FSK (foil-scrim-kraft) vapor barrier facing to meet installed performance requirements, with a 2" (51 mm) stapling tab.

Uses

Microlite XG is recommended as thermal insulation for the exterior of HVAC systems or other spaces or surfaces where temperature control is required.

Facing Information

FSK Aluminum Foil

Reinforced with fiber glass scrim laminated to UL rated kraft.

Permeance: 0.02 perms*

*Per ASTM E 96, Procedure A for facing material prior to lamination. After lamination, permeance values may be higher.

General Properties

Temperature (max.) – ASTM C 411

250°F (121°C)

Water vapor sorption – ASTM C 1104

<5% by weight

Corrosivity with steel – ASTM C 665

Does not accelerate

Fungi resistance – ASTM C 1338

Does not breed or promote

Standard Thicknesses and Packaging

	100' Roll (31 m)	75' Roll (23 m)	50' Roll (15 m)
Type	Thickness, in (mm)		
75	1½ (38)	2, 2½ (51, 58)	3 (76)
100	1½ (38)	2 (51)	—
150	—	1½ (38)	2 (51)

Note: Additional thicknesses, widths and other lengths available on special order. Contact Regional Sales Office for availability.



Surface Burning Characteristics

Microlite XG meets the Surface Burning Characteristics and Limited Combustibility of the following standards:

Standard/Test Method

- ASTM E 84
- UL 723
- NFPA 90A and 90B
- UL Guide No. 40 U8.3. Card R3711
- CAN/ULC S102-1188

Maximum Flame Spread Index	25
Maximum Smoke Developed Index	50

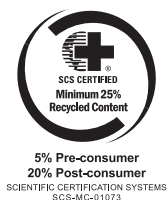
Notes: Faced materials are tested as composite products (insulation, adhesive and facing). UL labels supplied on packages when requested on order.

Specification Compliance

ASTM C 1290	Type 75, 100 & 150
ASTM C 553*	
Type II	Type 75, 100 & 150
Type III	Type 150
* For faced material: 250°F (121°C) maximum temperature.	
ASTM C 1136s	
Type II	FSK Facing
* Replaces HH-B-100B, Type II.	
Canada: CGSB 51-GP-11M	
NYC MEA 40-75-M	

Green Building Certifications

Recycled Content	SCS Certified
ES 1350	Meets Requirements
ENERGY STAR®	Yes
LEED® Credits	See JM.com/buildgreen,
LEED®-NC	JM LEED® Credit Guide
	(HIG-1231)



JM Formaldehyde-free™ Fiber Glass Insulation

JM Formaldehyde-free™ fiber glass insulation offers superior thermal and acoustical performance—and it improves indoor air quality because it's made without formaldehyde. Why is that important? Because the U.S. Environmental Protection Agency (U.S. EPA) recommends limiting exposure to formaldehyde as much as possible, and the California Air Resources Board, a division of the California EPA, recommends that builders and architects use building materials and insulation made without formaldehyde.



Microlite® XG™

Formaldehyde-free™ Fiber Glass Duct Wrap Insulation

Application Recommendations

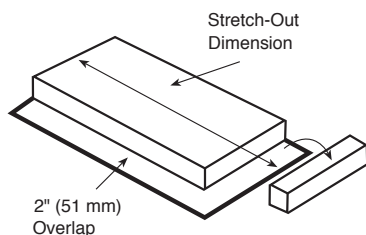
The R-value will vary depending upon how much the insulation is compressed during installation. To obtain the published installed R-values, the insulation stretch-out should be determined using the following table:

Duct Wrap Stretch-Outs

Labeled Thick. (in)	Installed Compressed Thickness (in)	Round	Square	Rectangular
1	0.75	P+ 7.0"	P+ 6.0"	P+ 5.0"
1½	1.125	P+ 9.5"	P+ 8.0"	P+ 7.0"
2	1.50	P+ 12.0"	P+ 10.0"	P+ 8.0"
2½	1.75	P+ 13.0"	P+ 11.0"	P+ 8.5"
3	2.25	P+ 17.0"	P+ 14.5"	P+ 11.5"

Stretch-outs include 2" (51 mm) for overlap. P = perimeter of duct to be insulated.

Prepare overlap by removing approximately 2" (51 mm) of insulation from facing.



Before applying duct wrap, sheet metal duct shall be clean, dry and tightly sealed at all joints and seams.

Wrap insulation around duct with facing to the outside so the 2" (51 mm) flap completely overlaps facing and insulation at the other end of stretch-out. Insulation shall be snugly butted.

Secure seams with outward clinching staples placed approximately 6" (152 mm) on center. If required, seal seam with pressure-sensitive tape designed for use with duct insulation. Insulation on the underside of ducts spanning 24" (610 mm) or greater shall be secured with mechanical fasteners and speed clips spaced approximately 18" (457 mm) on center. Fasteners should be cut off flush after the speed clips are installed, and when required, sealed with the same tape as specified above.

Adjacent sections of duct wrap insulation shall be snugly butted with the circumferential 2" (51 mm) tape flap overlapping and secured as recommended for the longitudinal seam. When a vapor seal is required, two coats of vapor retarder mastic reinforced with one layer of 4" (102 mm) wide, open-weave glass fabric may be used in lieu of pressure-sensitive tape.

Guide Specifications

Insulation for Metal Ducts. All ducts shall be insulated on the outside with a Formaldehyde-free™, flexible glass fiber blanket. Microlite XG Formaldehyde-free™ fiber glass duct wrap insulation should have a minimum installed R-value* of _____, and a Type _____ facing. Insulation shall be furnished with a factory-applied facing with a composite UL FHC rating of 25/50.

*The minimum insulation installed R-value should be determined in accordance to the duct operating and ambient conditions.

Thermal Conductivity (ASTM C 518)

Type	k* Compressed Thickness		k Labeled Thickness	
	Btu•in/(hr•ft²•°F)	W/m•°C	Btu•in/(hr•ft²•°F)	W/m•°C
75	0.27	0.039	0.29	0.042
100	0.25	0.036	0.27	0.039
150	0.24	0.035	0.25	0.036

Conductivity at 75°F (24°C) mean temperature.

*Tested with material thickness compressed 25%.

Installed R-values

Type	Labeled Thickness		Installed "R" [†]		Out-of-Package "R"	
	in	mm	(hr•ft²•°F)/Btu	m²•°C/W	(hr•ft²•°F)/Btu	m²•°C/W
75	1½	38	4.2	0.74	5.2	0.92
	2	51	5.6	0.99	6.9	1.22
	2½	58	6.5	1.15	8.0	1.41
	3	76	8.3	1.46	10.3	1.81
100	1½	38	4.5	0.79	5.6	0.99
	2	51	6.0	1.06	7.4	1.30
150	1½	38	4.7	0.83	6.0	1.06
	2	51	6.3	1.11	8.0	1.41

[†]Installed R-value calculated with a material thickness compressed to a maximum of 25% following recommended duct wrap stretch-outs.



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The physical and chemical properties of the Microlite® XG™ listed herein represent typical, average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Numerical flame spread and smoke developed ratings are not intended to reflect hazards presented by these or any other materials under actual fire conditions. Check with the Regional Sales Office nearest you to ensure current information. **All Johns Manville products are sold subject to Johns Manville's standard Terms and Conditions, including Limited Warranty and Limitation of Remedy. For a copy of the Johns Manville standard Terms and Conditions, Limited Warranty and Limitation of Remedy, and information on other Johns Manville thermal insulation and systems, call (800) 654-3103.**

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